

Dual N-Channel 20 V (D-S) MOSFET with Schottky Diode

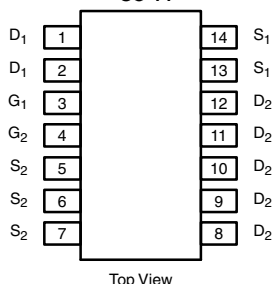
PRODUCT SUMMARY

	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^a	Q _g (Typ.)
Channel-1	20	0.0085 at V _{GS} = 10 V	14.8	8.1
		0.0115 at V _{GS} = 4.5 V	12.8	
Channel-2	20	0.0070 at V _{GS} = 10 V	22	8.4
		0.0095 at V _{GS} = 4.5 V	18.9	

SCHOTTKY PRODUCT SUMMARY

V _{DS} (V)	V _{SD} (V) Diode Forward Voltage	I _F (A)
20	0.55 V at 2.5 A	2

SO-14



Ordering Information: Si4340DDY-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

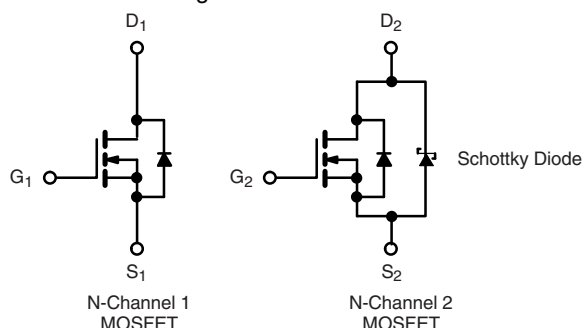
- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET[®] Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- DC/DC Converters, Synchronous Buck Converters
- Game Stations
- Notebook PC Logic



ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)

Parameter	Symbol	Channel-1	Channel-2	Unit
Drain-Source Voltage	V _{DS}	20		V
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	14.8	22	A
		11.8	17.6	
		12.1 ^{b, c}	16.3 ^{b, c}	
		9.7 ^{b, c}	13 ^{b, c}	
Pulsed Drain Current (t = 300 μs)	I _{DM}	50	60	
Source-Drain Current Diode Current	I _S	2.5	4.5	
		1.7 ^{b, c}	2.5 ^{b, c}	
Single Pulse Avalanche Current	I _{AS}	15		
Single Pulse Avalanche Energy	E _{AS}	11.25		mJ
Maximum Power Dissipation	P _D	3	5.4	W
		1.9	3.5	
		2 ^{b, c}	3 ^{b, c}	
		1.3 ^{b, c}	1.9 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Channel-1		Channel-2		Unit
		Typ.	Max.	Typ.	Max.	
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	53	62.5	35	42	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	35	42	18	23	

Notes:

a. Based on T_C = 25 °C.

b. Surface mounted on 1" x 1" FR4 board.

c. t = 10 s.

d. Maximum under steady state conditions for channel 1 is 110 °C/W and channel 2 is 87 °C/W.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)								
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit	
Static								
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	Ch-1	20			V	
		V _{GS} = 0 V, I _D = 250 μA	Ch-2	20				
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA	Ch-1		20		mV/°C	
		I _D = 25 mA	Ch-2		22			
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J	I _D = 250 μA	Ch-1		- 4.4			
		I _D = 25 mA	Ch-2		- 4.6			
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	Ch-1	1		2.5	V	
		V _{DS} = V _{GS} , I _D = 250 μA	Ch-2	1		2.5		
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	Ch-1			100	nA	
		V _{DS} = 0 V, V _{GS} = ± 20 V	Ch-2			100		
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V	Ch-1			1	μA	
		V _{DS} = 20 V, V _{GS} = 0 V	Ch-2			100		
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 85 °C	Ch-1			15		
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 85 °C	Ch-2			10 000		
On-State Drain Current ^b	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	Ch-1	20			A	
		V _{DS} ≥ 5 V, V _{GS} = 10 V	Ch-2	30				
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 11.5 A	Ch-1		0.0065	0.0085	Ω	
		V _{GS} = 10 V, I _D = 15.2 A	Ch-2		0.0060	0.0070		
		V _{GS} = 4.5 V, I _D = 10 A	Ch-1		0.0091	0.0115		
		V _{GS} = 4.5 V, I _D = 14 A	Ch-2		0.0077	0.0095		
Forward Transconductance ^b	g _{fs}	V _{DS} = 10 V, I _D = 11.5 A	Ch-1		28		S	
		V _{DS} = 10 V, I _D = 15.2 A	Ch-2		44			
Dynamic ^a								
Input Capacitance	C _{iss}	Channel-1 V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	Ch-1		862		pF	
			Ch-2		956			
Output Capacitance	C _{oss}	Channel-2 V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz	Ch-1		280			
			Ch-2		363			
Reverse Transfer Capacitance	C _{rss}		Ch-1		116			
			Ch-2		120			
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 12 A	Ch-1		17.4	26	nC	
		V _{DS} = 10 V, V _{GS} = 10 V, I _D = 12 A	Ch-2		17.8	27		
Gate-Source Charge	Q _{gs}	Channel-1 V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 12 A	Ch-1		8.1	12.5		
			Ch-2		8.4	12.5		
		Channel-2 V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 12 A	Ch-1		2.2			
			Ch-2		2.6			
Gate-Drain Charge	Q _{gd}		Ch-1		2.4			
			Ch-2		2.5			
Gate Resistance	R _g	f = 1 MHz	Ch-1		2.2	4.4	Ω	
			Ch-2		2.6	5.2		

Notes:

- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.



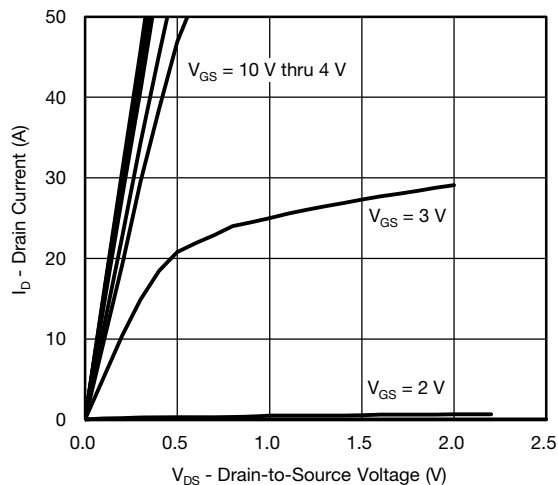
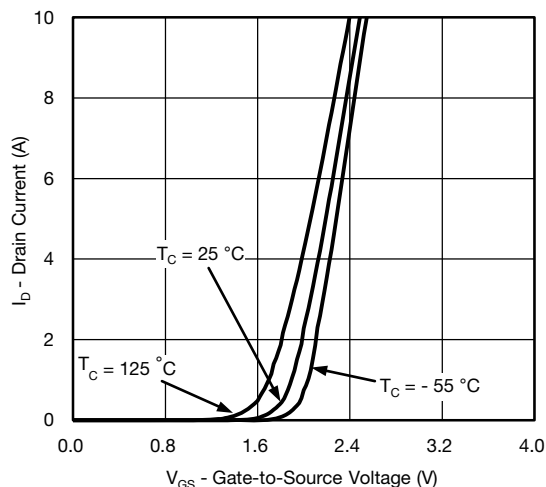
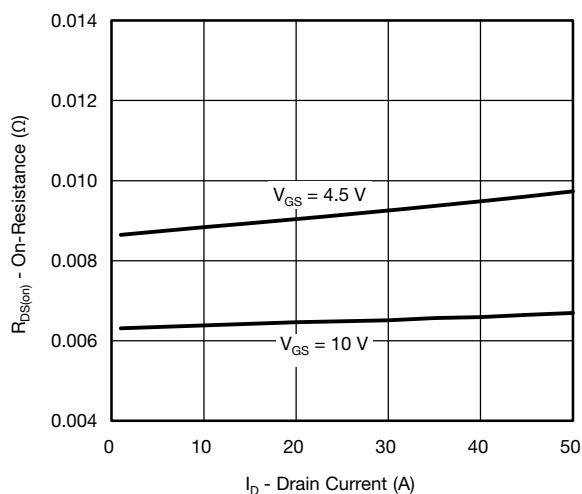
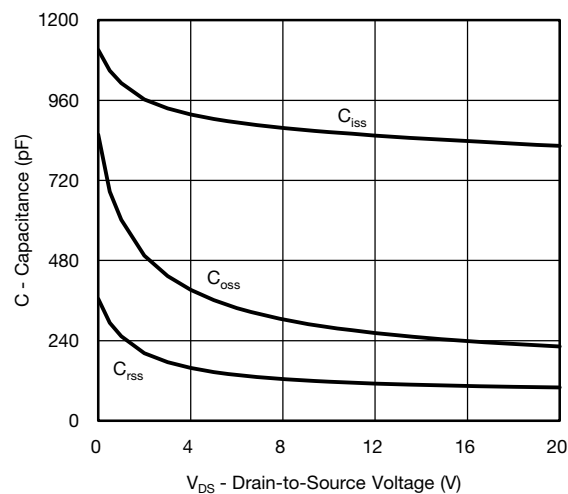
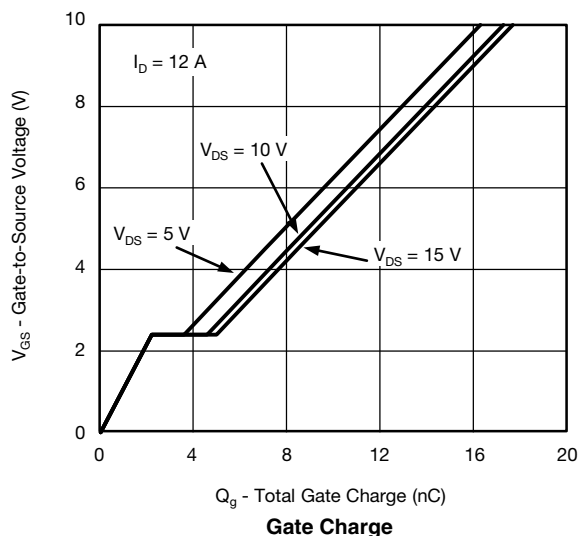
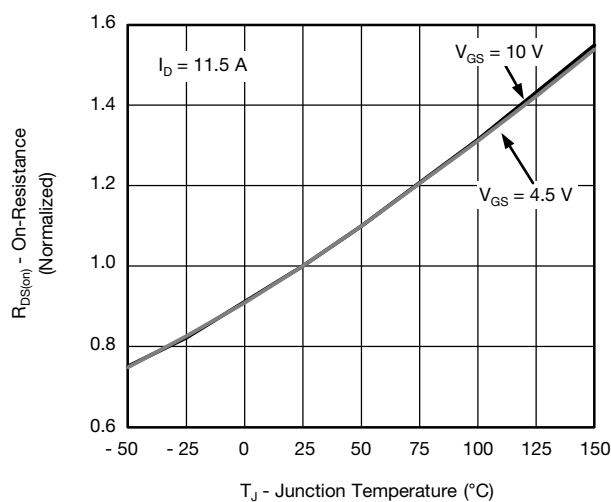
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Dynamic ^a							
Turn-On Delay Time	t _{d(on)}	Channel-1 V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω	Ch-1		18	35	ns
			Ch-2		20	40	
Rise Time	t _r		Ch-1		37	70	
			Ch-2		34	65	
Turn-Off Delay Time	t _{d(off)}	Channel-2 V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω	Ch-1		19	35	
			Ch-2		21	40	
Fall Time	t _f		Ch-1		10	20	
			Ch-2		10	20	
Turn-On Delay Time	t _{d(on)}	Channel-1 V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch-1		9	18	
			Ch-2		9	18	
Rise Time	t _r		Ch-1		13	26	
			Ch-2		13	26	
Turn-Off Delay Time	t _{d(off)}	Channel-2 V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω	Ch-1		16	32	
			Ch-2		15	30	
Fall Time	t _f		Ch-1		8	16	
			Ch-2		8	16	
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	Ch-1			2.5	A
			Ch-2			4.5	
Pulse Diode Forward Current ^a	I _{SM}		Ch-1			50	
			Ch-2			60	
Body Diode Voltage	V _{SD}	I _S = 5 A	Ch-1		0.76	1.2	V
		I _S = 2.5 A	Ch-2		0.43	0.55	
Body Diode Reverse Recovery Time	t _{rr}	Channel-1 I _F = 9.2 A, dI/dt = 100 A/μs, T _J = 25 °C	Ch-1		18	36	ns
			Ch-2		18	36	
Body Diode Reverse Recovery Charge	Q _{rr}		Ch-1		7	14	nC
			Ch-2		7	14	
Reverse Recovery Fall Time	t _a	Channel-2 I _F = 2.5 A, dI/dt = 100 A/μs, T _J = 25 °C	Ch-1		8		ns
			Ch-2		10		
Reverse Recovery Rise Time	t _b		Ch-1		9		
			Ch-2		9		

Notes:

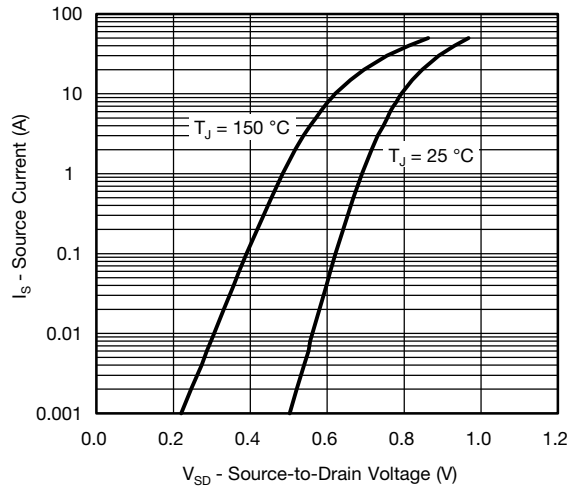
a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.

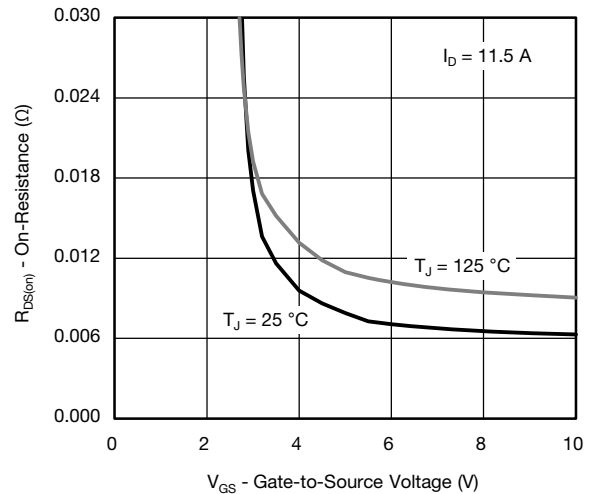
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**Output Characteristics****Transfer Characteristics****On-Resistance vs. Drain Current****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature**

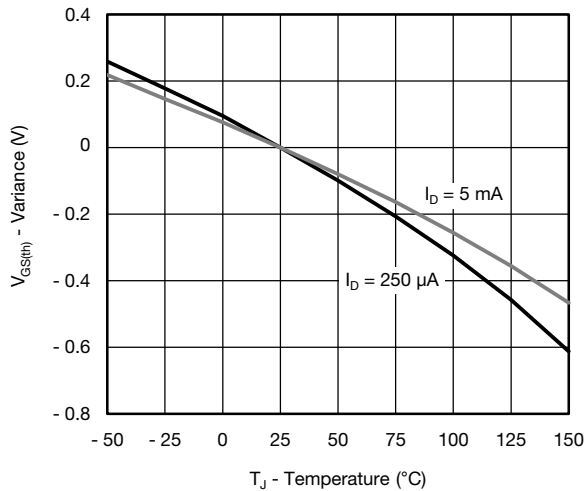
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



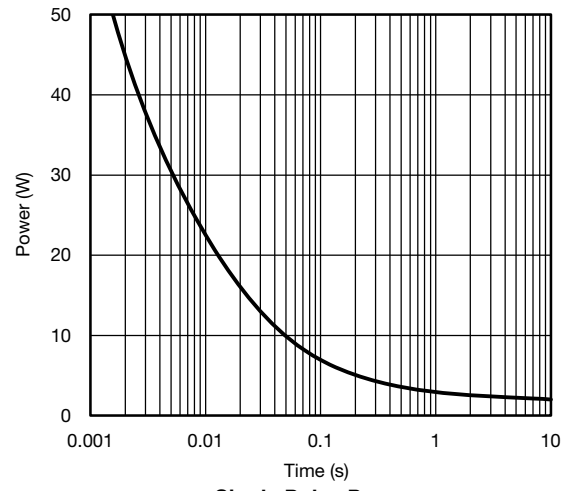
Source-Drain Diode Forward Voltage



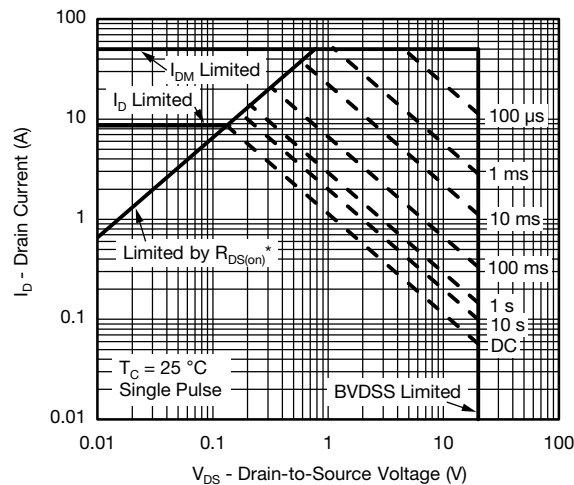
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

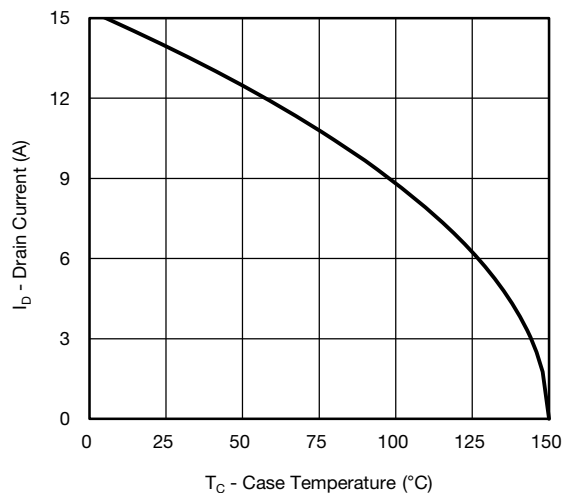
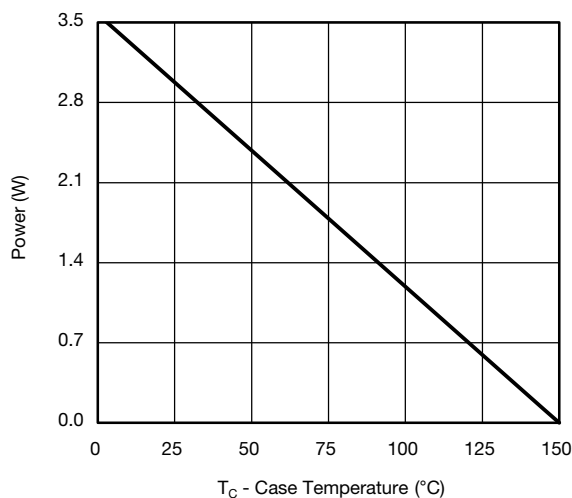
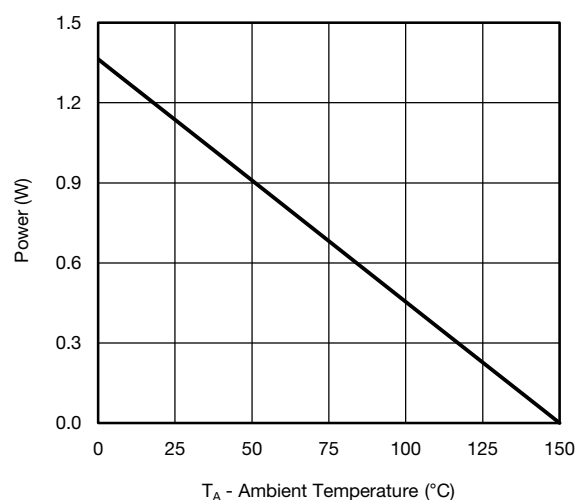


Single Pulse Power



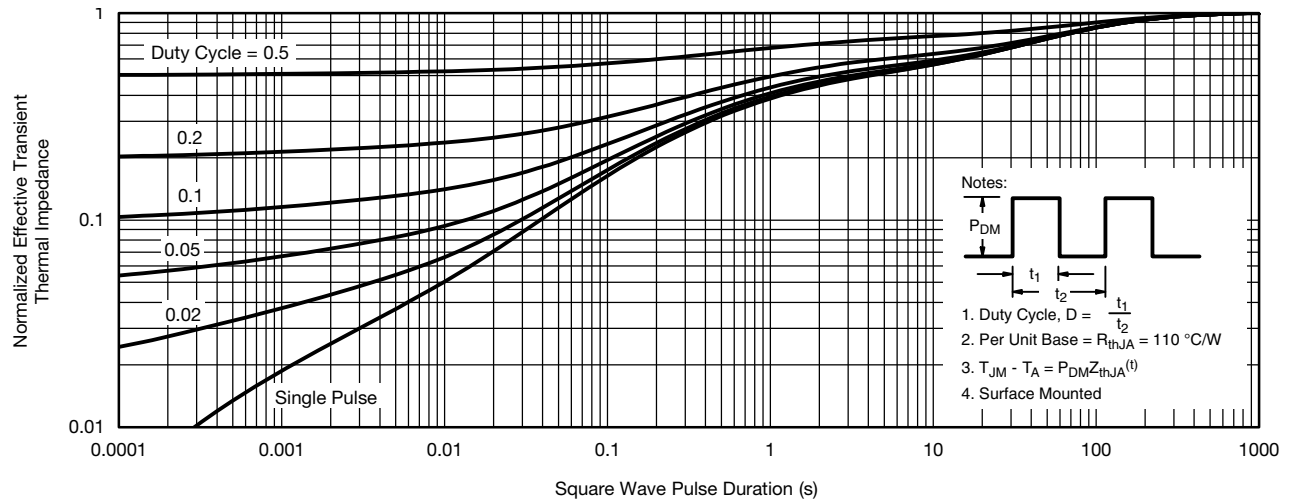
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

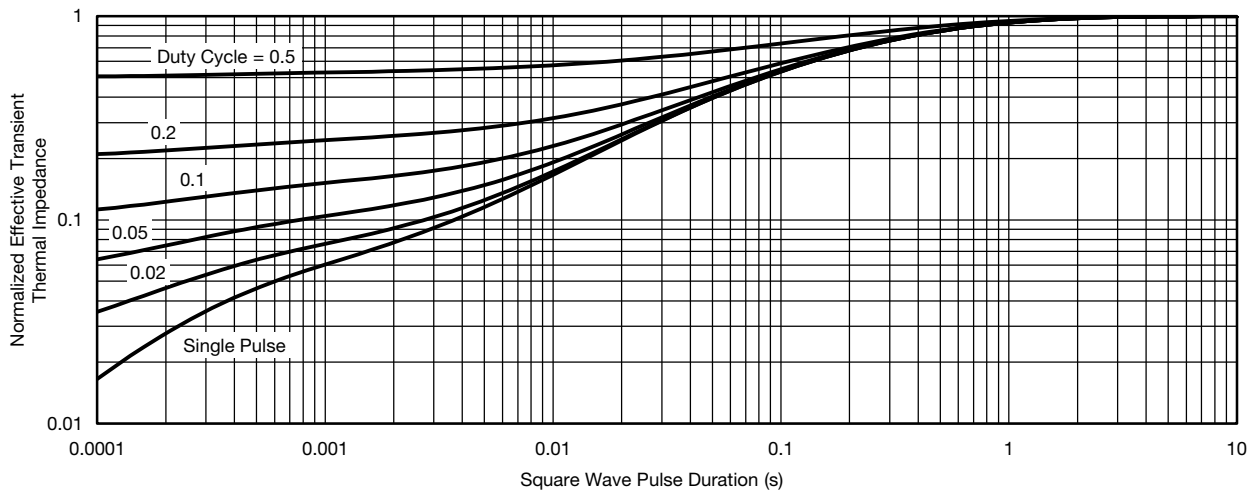
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**Current Derating*****Power Derating, Junction-to-Foot****Power Derating, Junction-to-Ambient**

* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

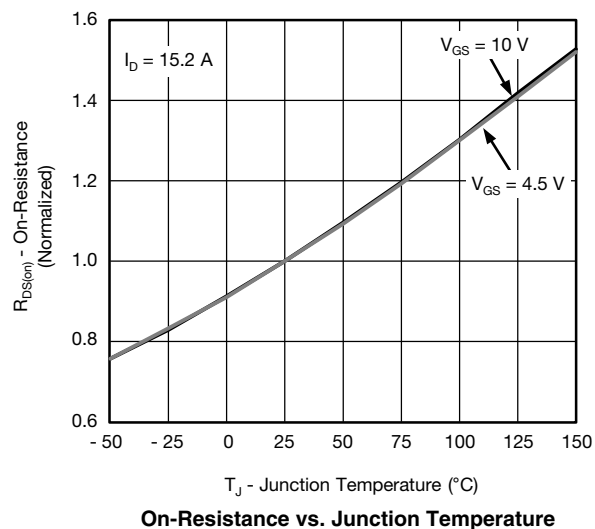
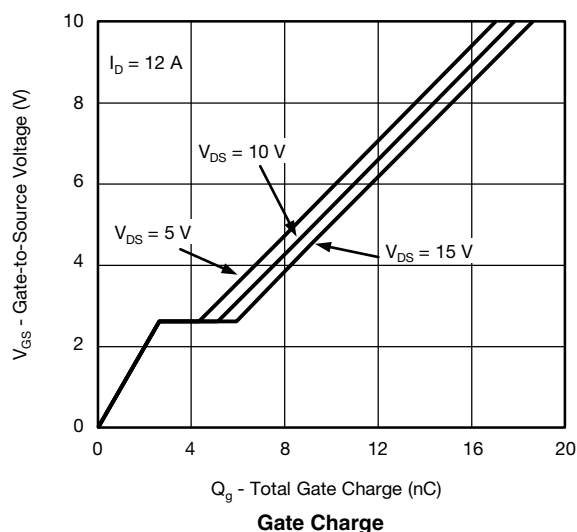
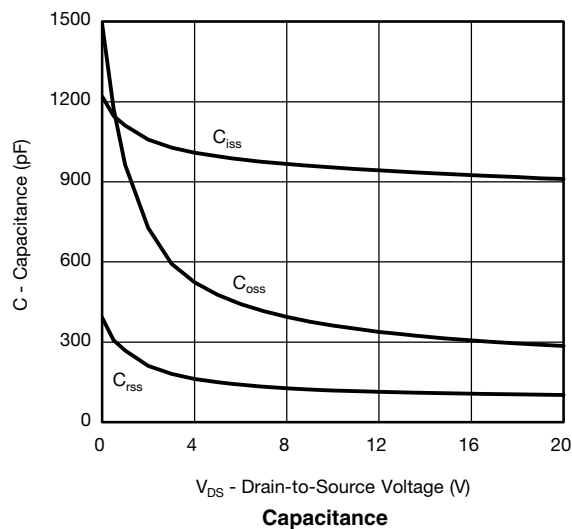
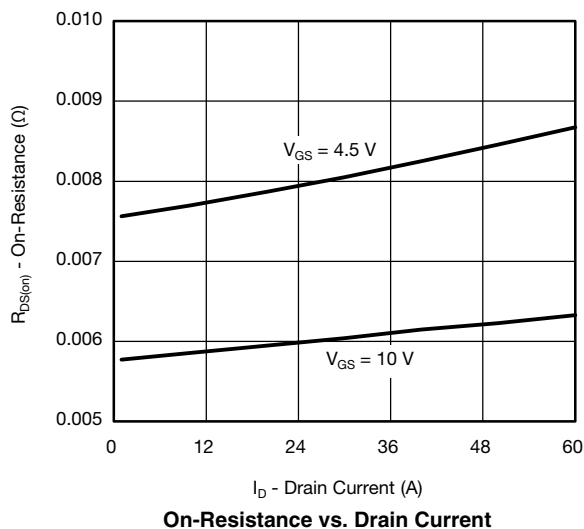
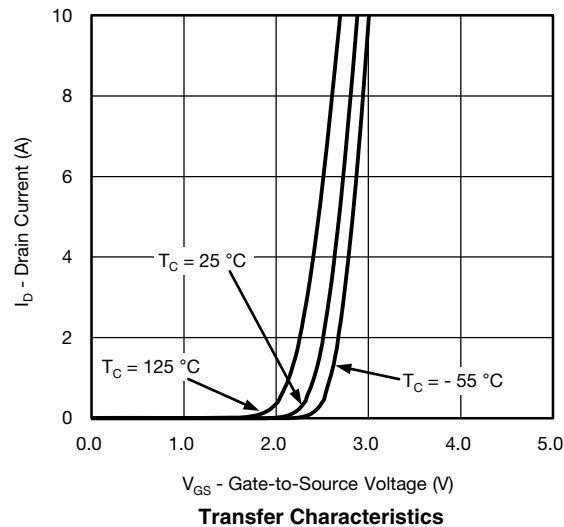
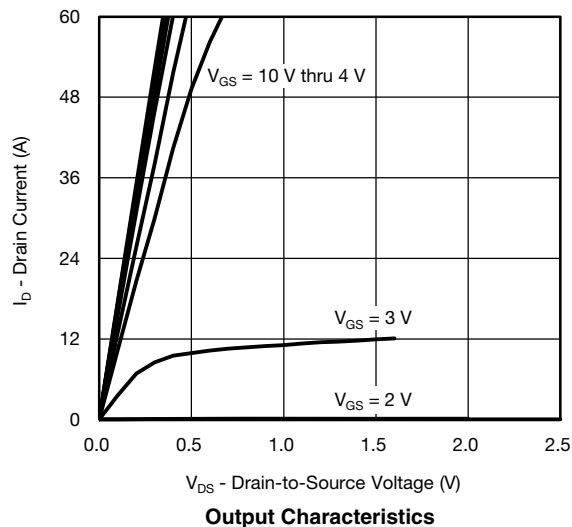
CHANNEL-1 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



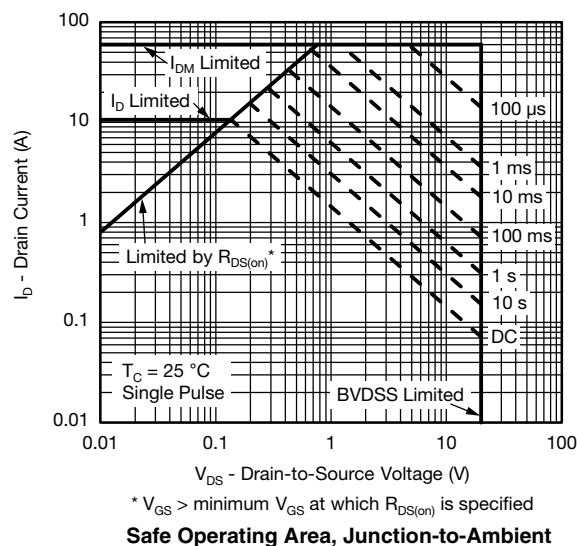
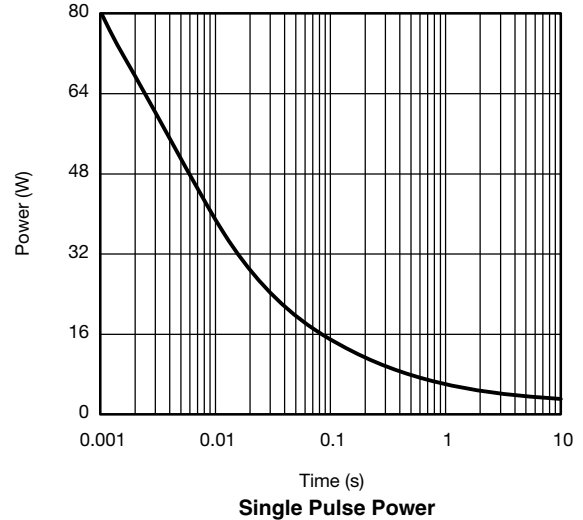
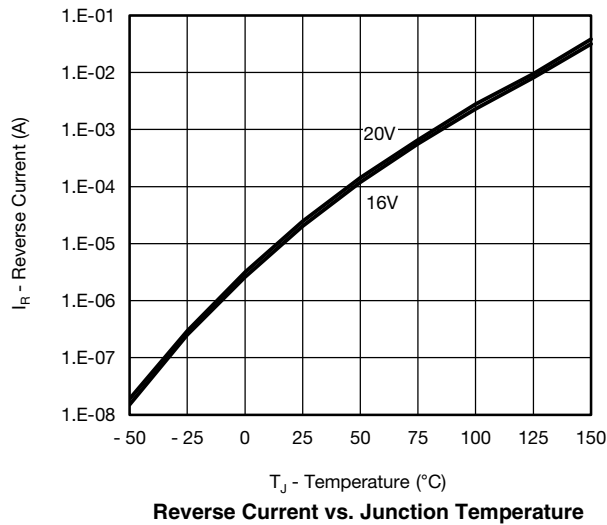
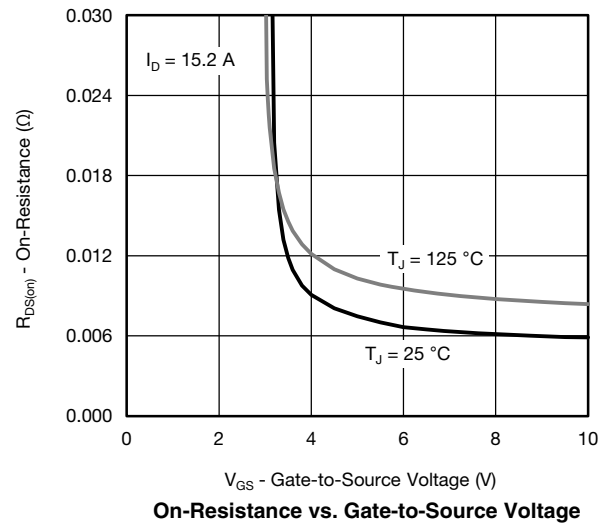
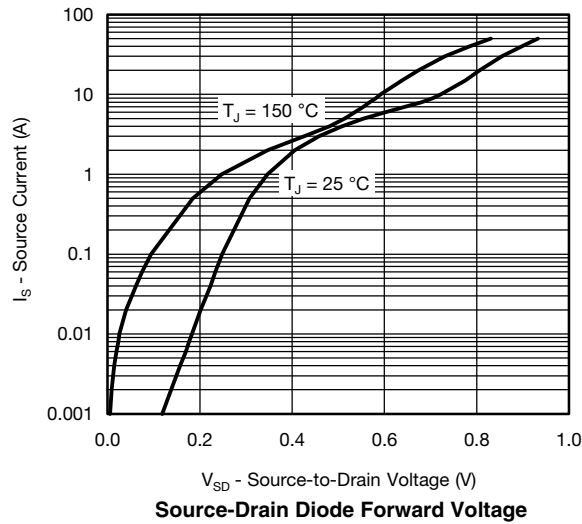
Normalized Thermal Transient Impedance, Junction-to-Ambient

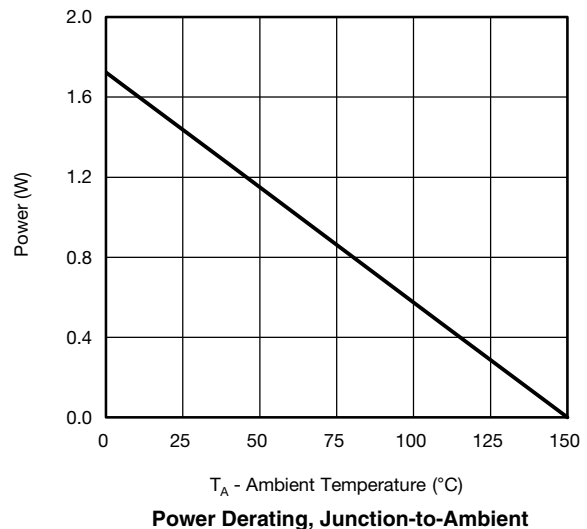
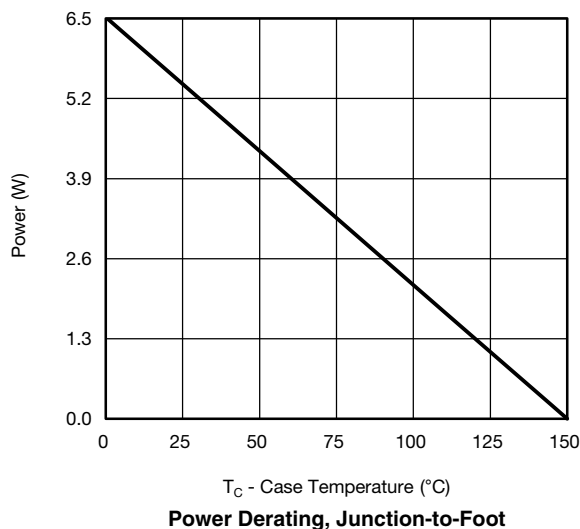
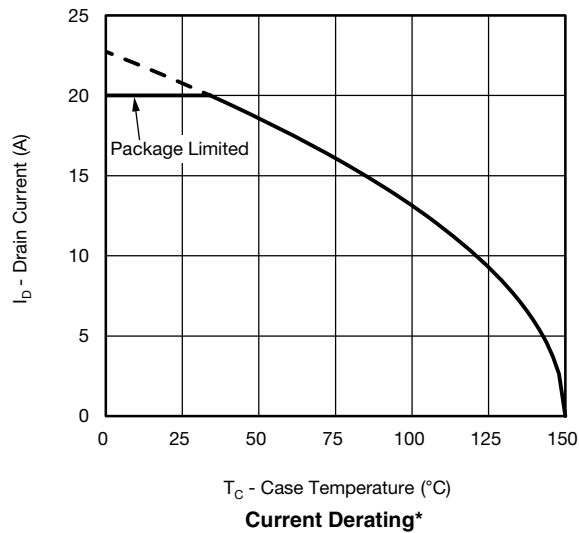


Normalized Thermal Transient Impedance, Junction-to-Foot

CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

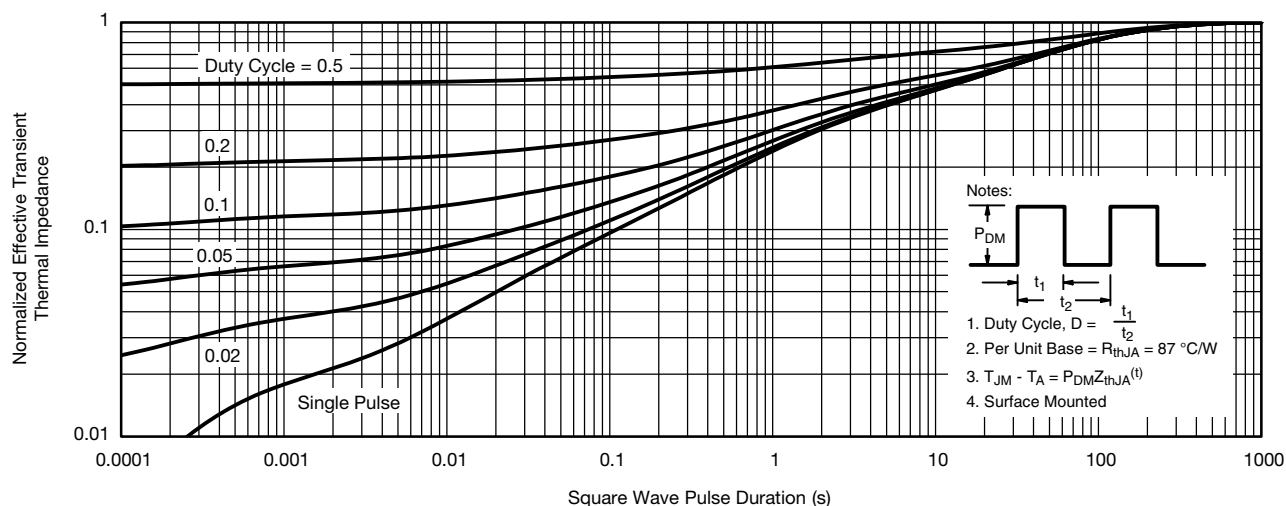
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



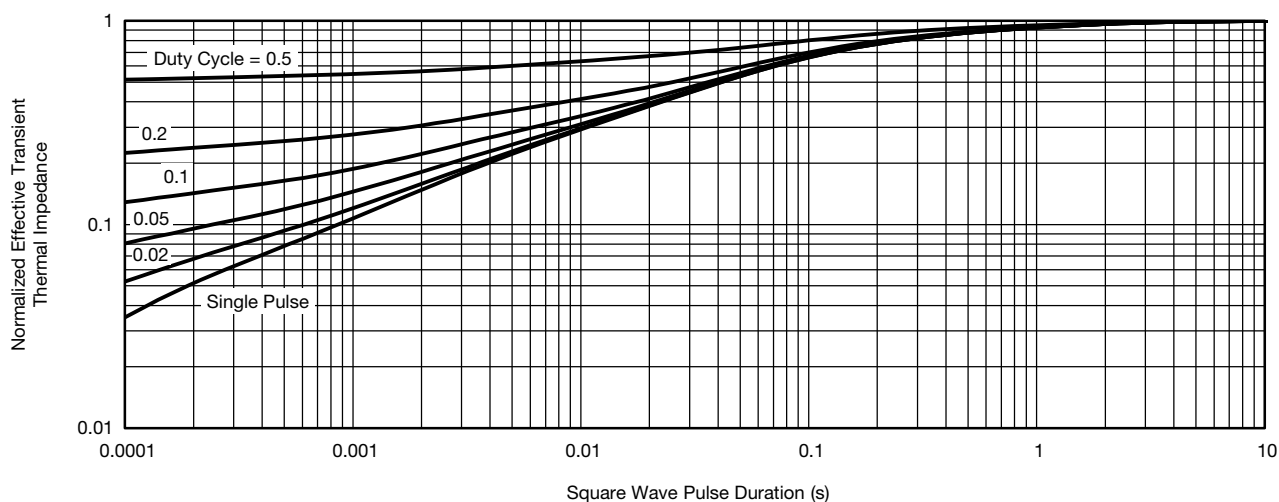
CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

CHANNEL-2 TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

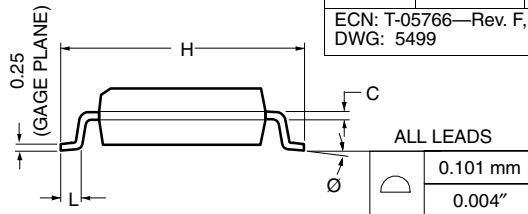
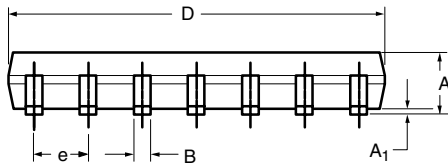
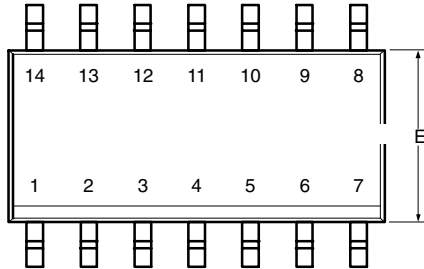


Normalized Thermal Transient Impedance, Junction-to-Foot

Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package/tape drawings, part marking, and reliability data, see www.vishay.com/ppg?67583.



SOIC (NARROW): 14-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A₁	0.10	0.20	0.004	0.008
B	0.38	0.51	0.015	0.020
C	0.18	0.23	0.007	0.009
D	8.55	8.75	0.336	0.344
E	3.8	4.00	0.149	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
L	0.50	0.93	0.020	0.037
Ø	0°	8°	0°	8°

ECN: T-05766—Rev. F, 19-Sep-05
DWG: 5499



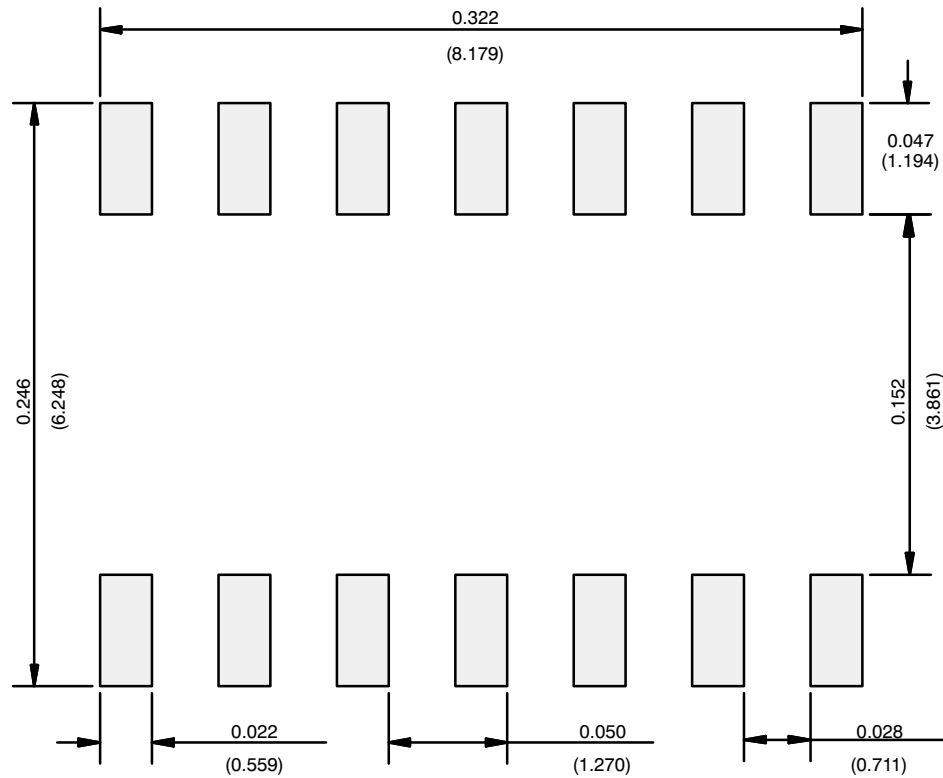
Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.

RECOMMENDED MINIMUM PADS FOR SO-14



Recommended Minimum Pads
Dimensions in Inches/(mm)

[Return to Index](#)



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9